REMARKS

Claims 1-37 are pending in this application. Claims 8-10, 12, 13, 17, 23, 29, 32, 33 and 34 are rejected under 35 USC 112, second paragraph, as being indefinite. Claims 1-5, 13, 17, 18, 21, 23 and 25 are rejected under 35 USC 102 as being anticipated by, or in the alternative, under 35 USC 103(a) as being unpatentable over Wang. Claims 1-37 are rejected under 35 USC 102 as being anticipated by, or in the alternative, under 35 USC 103(a) as being unpatentable over Spitsberg. The applicant is requested to amend the continuing data in the disclosure to update the status of the parent application.

The specification is amended herein to reflect the issued patent number of the parent application. The specification is also amended to correct several typographical errors where question marks were inadvertently included in chemical formulas due to a software error.

Claims 9, 10, 12, 32 and 33 have been amended to eliminate the term "ratio". The term "ratio" is retained in claim 8 wherein there is no percentage.

Claim 17 has been amended to delete the term "preferentially".

Claim 23 has been amended to clarify the terminology.

Claims 13 and 34 are not outside the scope of the claims from which they depend. The aggregation of the independent claims includes two types of particles, and these claims merely recite that one of the two types of particles comprise hollow spheres. The claim language does not state or infer that spheres are aggregations, but rather that the claimed aggregations include spheres.

The language of claim 29 does not state or infer that a matrix is a particle. Independent claim 28 describes a sintered aggregation as comprising ceria particles and mullite particles within a binding matrix material. Claim 29 simply further describes the aggregation as also including alumina particles, along with the ceria and mullite particles of claim 28.

The applicant traverses the rejection of claims 1-5, 13, 17, 18, 21, 23 and 25 in view of the Wang. Note that independent claims 1 and 21 have been amended

herein, and they contain the limitations of two different types of particles within a binding matrix, and that at least one of the types of particles contains micro cracking within the particles as a result of the different coefficients of thermal expansion of the two types of particles.

First, Wang teaches away from having two types of particles within a binding matrix, since he illustrates and describes only one type of particle (item 12 of FIG. 1 and item 24 of FIG. 2) within respective binding matrices (item 14 of FIG. 1 and item 26 of FIG. 2). The Examiner states that Wang teaches "the addition of ceria and zirconia to an alumina containing matrix." This is a misstatement of the teaching of Wang, since Wang states at column 4, lines 28 and 51 that the alumina is within a matrix, rather than being the matrix material. The alumina is illustrate in Wang as item 12 in FIG. 1 and item 24 in FIG. 2. The ceria and zirconia of Wang are constituents of the matrix material 14, 26 as described at column 4, lines 29 and 51. Thus, Wang teaches only a single type of particle within a binding matrix, and that the binding matrix contains multiple oxide phases. The fact that the matrix material of Wang includes more than one phase of oxide (i.e. nanostructured ceramic oxide and/or rare earth oxide) does not teach or anticipate the presently claimed materials containing two different types of particles within a binding matrix material. The Examiner should not be mislead by the zoomed-in highlighted view of the matrix materials 14, 26 that are provided in FIGs. 1 and 2 of Wang, since the use of small circles to represent multiple phases of oxides in a schematic illustration of a matrix material does not give rise to a teaching of a multiple particle material within that binding matrix material.

Second, Wang fails to teach or describe any micro cracking of the particles within the binding matrix, and such micro cracking of the particles is not inherent in the Wang material. The intergranular micro fracture features that are discussed in column 9, line 27 are the result of mechanical wear at the surface of the material and are not a property of the material. The material of Wang does not have the claimed two types of particles with sufficiently different coefficients of thermal expansion that give rise to the thermal stresses that can cause such claimed micro cracking of the particles, since the material of Wang only has one type of particle (alumina) held within the binding matrix. Furthermore, the ceria and zirconia cited by the Examiner both have relatively

high coefficients of thermal expansion and they do not exhibit the difference in coefficients of thermal expansion described in the present specification and specifically claimed in the various dependent claims. Importantly, if cracking in a material is desired as with the present invention, Wang teaches away from the addition of ceria and zirconia to alumina, since he states in column 9, lines 57 that the additives of ceria and zirconia reduce the cracking.

Furthermore, Wang fails to teach or suggest the dependent claim 13 limitation that at least one of the first particles and the second particles comprise hollow spheres. The schematic illustration of oxide phases as hollow round circles in FIGs. 1 and 2 of Wang should not be interpreted as describing a hollow sphere particle within a binding matrix, since those oxides are part of the matrix material, not the particles 12, 24, and because they are not, in fact, hollow spheres but are simply illustrated as such in these schematic diagrams.

Furthermore, Wang alone fails to teach or suggest the claim 21 limitations of an aggregate material bonded to a ceramic matrix composite material, or the dependent claim 23 limitations of a further layer of ceramic thermal insulating material bonded to the ceramic matrix composite material.

In summary, Wang does not anticipate any of the rejected claims 1-5, 13, 17, 18, 21, 23 and 25 under 35 USC 102(a or e), and further, Wang does not provide *prima facie* basis for an obviousness rejection of any of these claims under 35 USC 103(a).

The applicant also traverses the rejection of claims 1-37 in view of Spitsberg.

Spitsberg fails to teach or suggest the limitations of amended independent claims 1 and 21 of micro cracking within the particles, but rather teaches cracking within the matrix material.

Spitsberg also fails to teach or suggest the limitation of independent claim 28 of both ceria particles and mullite particles within a binding matrix material. The only mention of ceria in Spitsberg is at column 6, line 10 where he is describing ceria stabilized zirconia for use as the intermediate layer 28. Spitsberg contains no mention of ceria particles within a matrix material, nor of the combination of ceria particles with mullite particles.

Furthermore, the applicant incorporates herein by reference the litany of the various pending dependent claims and their respective limitations. The Examiner has summarily dismissed thirty-seven claims in view of Spitsberg with less than five lines of discussion and without mentioning the majority of the limitations of the various claims. Should the Examiner elect to maintain any rejection of any claim in a further Office Communication, the applicant respectfully requests that the Examiner provide a more complete description of the basis in the art that is used to support such rejection.

In summary, Spitsberg does not anticipate any of the rejected claims 1-37 under 35 USC 102(a or e), and further, Spitsberg does not provide *prima facie* support for an obviousness rejection of any of these claims under 35 USC 103(a).

Reconsideration of the amended application in light of the above Remarks and allowance of claims 1-37 are respectfully requested.

Respectfully submitted,

David G. Maire

David G. Maire (Reg. No. 34,865)
Beusse Brownlee Wolter Mora & Maire, P.A.
390 North Orange Ave., Suite 2500
Orlando, FL 32801
Telephone: 407-926-7704